IN THE DRAWINGS

The attached sheets of drawings include changes to FIGs. 2A, 2B, 3 and 4A. These sheets, which include sheets 2-4 (of 5) replace the original sheets 2-4. In FIGs. 2a, 2B, 3, and 4A, a "Prior Art" legend has been added.

Attachment: Replacement sheets 2-4 (of 5).

REMARKS

Claims 1-26 are pending in the application. Claims 1, 11-14, 17-22 and 26 have been amended. No new matter has been added. Reconsideration of the claims, in view of the comments provided below, is respectfully requested.

An amendment has been made to correct an error in the Brief Description of the Drawings. No new matter is being entered by the amendment.

Objections to Drawings

The Examiner objected to Figures 1, 2A, 2B, 3 and 4A for failing to include a "Prior Art" legend. Replacement sheets containing amended FIGs. 2A, 2B, 3 and 4A accompany this Amendment. Applicants respectfully disagree with the requirement to label FIG. 1 with a "Prior Art" legend, since all the elements of claim 1 are present in FIG. 1, and request that this objection be withdrawn.

Rejections Under 35 U.S.C. § 112

Claim 26 was rejected under 35 U.S.C. § 112, second paragraph for having insufficient antecedent basis. Claim 26 has been amended and is believed to comply with 35 U.S.C. § 112.

Rejections under 35 U.S.C. § 103(a)

Claims 1, 2 and 4-26

Claims 1, 2, and 4-26 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Nishimae et al. (U.S. Patent No. 6,724,546) in view of Dewald (U.S. Patent No. 6,591,022). It is stated that Nishimae teaches an image display system having an image display unit disposed on the path of an output beam and a non-circular aperture, but does not teach an integrator capable of producing a non-circular output light beam when illuminated by a circular input light beam. It is further stated in the Office Action that Dewald teaches a similar image display system, which includes an integrator and a color wheel to make the output light have color. It is also stated that Dewald teaches an integrator in which a circular input beam is made non-circular by the light guide (integrator), and that by using such an exit aperture, distortion is eliminated with respect to the color wheel and the final image. The assertion is made that since it would be desirable to

eliminate any distortions possible in an image display system such as that taught by Nishimae, it would have been obvious to use Dewald's integrator to eliminate distortions.

Three criteria must be met to establish a *prima facie* case of obviousness. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference. Second, there must be a reasonable expectation of success. Finally, the prior art reference, or combination of references, must teach or suggest all the claim limitations. MPEP § 2142. Applicant respectfully traverses the rejection since the proposed combination of prior art fails to disclose all the claim limitations.

Nishimae teaches, for example in FIG. 1A, a system in which light is generated by a lamp (1), and the light is focused using a mirror (2) and lens (3), through a color wheel to an integrator (5) in the form of a rectangular parallelepiped. The light from the integrator passes through a first group of lenses (6) and an aperture (7), is reflected at a folding mirror (8), and passes through a second group of lenses (9) before being directed to the modulator element (11) by a total internal reflection prism (10). FIG. 4B shows the aperture to be noncircular.

Dewald's integrator (902) shown in FIG. 9 has an elliptical input aperture (980) and a shaped output aperture (910).

The invention of amended claim 1 is directed to an image display system that includes an integrator capable of producing an output light beam having an angular distribution that is greater in a first dimension across the beam than in a second dimension across the beam orthogonal to the first dimension when illuminated by a circular input light beam. An image display unit is disposed on the path of the output light beam. A non-circular aperture is disposed on the path of the output light beam, between the integrator and the image display unit.

Neither of the references teach or suggest the use of an integrator that produces an output beam having an angular distribution greater along one dimension than the other when illuminated by a circular input beam that has the same angular distribution in the two dimensions. While Dewald's apertured integrator changes the shape of the cross-section of the light beam, Dewald's integrator does nothing to change the angular distribution of the light, and so the angular distribution of the light is the same at the output as at the input.

Accordingly, since the proposed combination of references fails to teach or suggest the elements of claim 1, claim 1 is not obvious and is patentable.

The invention of claim 14 is directed to an optical system that has a light source capable of generating a beam of illumination light having a non-circular angular distribution and an image display unit illuminated by the beam of illumination light. A non-circular aperture is disposed on the path of the beam of illumination light having the non-circular cross-section, the non-circular aperture being disposed between the light source and the image display unit.

Neither of the references teach or suggest a light source that produces a light beam whose angular distribution is non-circular, i.e. whose angular distribution is circularly symmetric. It is important to note the difference here between the angular distribution and the cross-sectional shape of the light. The cross-sectional shape of the light beam is altered by Dewald's apertured integrator. However, this apertured integrator does not change the angular distribution, or divergence of the light.

Accordingly, since neither of the references teach or suggest all the elements of the claimed invention, claim 14 is allowable.

Dependent claims 2, 4-13, and 15-26, which depend from claims 1 and 14 and further define the inventions of claims 1 and 14, were also rejected under 35 U.S.C. §103(a) as being obvious in view of the combination of Nishimae and Dewald. While Applicants do not acquiesce with the particular rejections to these dependent claims, it is believed that these rejections are moot in view of the remarks made in connection with independent claims 1 and 14. Therefore, dependent claims 2, 4-13, and 15-26 are also in condition for allowance.

Claim 3

Claim 3 is rejected under 35 U.S.C. § 103(a) as being unpatentable over the combination of Nishimae and Dewald in view of Koyama et al. (U.S. Patent No. 6,607,280 B2) (Koyama). It is stated in the Office Action that Nishimae and Dewald do not teach the use of a tapered tunnel integrator, but that Koyama does teaches a tapered tunnel integrator and that it would have been obvious to one of ordinary skill in the art to include Koyama's tunnel integrator to achieve a better more uniform light beam.

Koyama teaches an illumination system for a completely different type of image projection system than that of the subject claims. *Inter alia*, an important difference between Koyama's system and the claimed system is that Koyama's system is based on a liquid crystal display (LCD) (Summary of the Invention, col. 2, lines 34-37) and uses a Schlieren arrangement.

This arrangement operates in the following manner (see FIG. 18 and the description thereof at col. 1, line 24 – col. 2, line 14. In summary, the illumination light is focused to a bending mirror (5), which directs the light to the reflection liquid crystal (LC) panels (9, 10, 11) via a cross dichroic prism (8). The illumination light is non-normally incident at the LC panels and the resulting image light is directed through an aperture of a stop (12) which lies is at the focus of the image light. The pixels of each LC panel specularly reflect light when in the "on" state (when forming an image) and diffusely scatter light when in the "off" state (not forming an image). The aperture of the stop is sufficiently small that it blocks passage of much of the scattered "off" light.

The apertures in this type of projection system play a very different role, therefore, from the aperture in the type of projection system of the subject claims. The aperture in the presently claimed invention is used to reduce the presence of diffracted light from the display panel, which is present whether or not the pixels are in the "off" or "on" states. The apertures in Koyama's system are used to restrict the passage of "off" state light. Therefore, the combination of using a tunnel integrator that produces an output having an angular distribution that is greater in a first dimension across the beam than in a second dimension across the beam orthogonal to the first dimension along with a non-circular aperture would not become obvious to one of ordinary skill in the art when using a display panel having an array of tiltable mirrors.

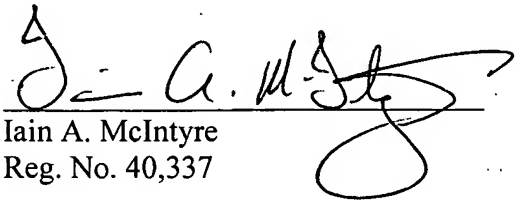
Conclusion

In view of the amendments and reasons provided above, it is believed that all pending claims are in condition for allowance. Applicant respectfully requests favorable reconsideration and early allowance of all pending claims.

Respectfully submitted,

On behalf of 3M Innovative Properties Company
Customer No. 32692

Date: July 25, 2005

By: 

Iain A. McIntyre
Reg. No. 40,337